

**METHOD AND APPARATUS FOR  
INCREASING THE TEMPERATURE OF A FUEL CELL**

**Abstract**

A method and apparatus increase the temperature of a fuel cell via reactant starvation at one or both electrodes. Reactant starvation at an electrode results in an increased overvoltage at the electrode and hence increased internal heat generation under load. Further, starvation techniques may be used to prevent poisoning of electrode catalysts, a potential problem that is aggravated at lower temperatures. Starvation conditions can be prolonged or intermittent and can be obtained, for example, by suitably reducing the supply rate of a reactant or by operating the fuel cell at sufficiently high current density so as to consume reactant faster than it is supplied. The method can allow for some generation of useful power by the fuel cell during start-up. The method is particularly suitable for starting up a solid polymer electrolyte fuel cell from temperatures below 0°C.